Cambridge in June, 1911. The photographs in question are unique, inasmuch as in place of the usual comparisons at opposite points of the limb, they compare the spectra at points 90° apart, at intervals of 15° completely round the sun. By this arrangement the velocities in the two hemispheres may be separately derived, and Mr. Hubrecht concludes that at the period of these observations the velocities were greatest in the northern hemisphere. Thirty lines, belonging to seven elements, and including four enhanced lines, were measured, and no departure from average results was found for any of them. There was, however, a distinct diminution of the indicated velocity with increase of wave-length, for which no definite explanation can yet be given. In relation to heliographic latitude, the results are remarkable as showing uniform angular velocity from 15° N. to 15° S., and, following the usual decline to higher latitudes, a slight increase between latitudes 60° and 75°. The deduced angular velocities as a whole are also considerably smaller than those derived at Mt. Wilson, and the equatorial velocity is assigned the correspondingly low value of 1·85 km. per second.

These departures from the average results of other observers were constant throughout the period of observation, and there is evidence that they were not due to local disturbances; Mr. Hubrecht appears to regard them as possibly associated with temporary conditions in the sun, and believes that his results are consistent with Emden's theory.

A somewhat remarkable feature of Mr. Hubrecht's memoir is its appearance as vol. iii., part i., of the Annals of the Solar Physics Observatory, Cambridge, since it refers to data obtained before the transfer of the Solar Physics Observatory from South Kensington, and discussed after the author had left Cambridge. Vols. i. and ii. of these Annals have not yet been issued, and we have been unable to ascertain what their contents will be.

## *NOTES.*

We learn with much satisfaction that the announcement of the death of Prof. I. P. Pavlov is incorrect; and we may hope, therefore, that the record of his work given in Nature of March 2 will be extended still further in the coming years. Prof. B. Menschutkin, of the Polytechnic Institute, Petrograd, writing on March 20, informs us that Prof. Pavlov is alive and well, and that the Prof. Pavlov who died in February was Eugeni Vasilievitch Pavlov, a celebrated surgeon. The name of Pavlov is common in Russia, there being no fewer than five professors of that name in Petrograd, so that the mistake in the *Times* of February 12 is quite comprehensible.

The death is announced, at Ottawa, of Dr. W. F. King, chief astronomer, Department of the Interior, Canada, and director of the Dominion Astronomical Observatory; also of the Rev. J. B. McClellan, formerly principal of the Royal Agricultural College, Cirencester.

The bronze tablet placed in St. Paul's Cathedral to the memory of Captain Scott and his companions will be unveiled by the Prime Minister on Friday, May 5.

A conference on engineering and scientific research will be held at Caxton Hall, Westminster, on Monday next, May 1, at 5 p.m. The conference will be opened by Prof. J. A. Fleming, and a number of leading representatives of engineering science are expected to take part in the discussion.

His Excellency Lord Carmichael has accepted the chairmanship of the trustees of the Indian Museum for the year 1916–17. The Hon. Justice Sir Asutosh Mookerjee has been elected vice-chairman, and the Hon. Raja Rishe Case Law honorary treasurer.

The council of the Institution of Civil Engineers has made the following awards for papers read and discussed during the session 1915–16:—A Telford gold medal to Sir John Benton (Eastbourne); a Watt gold medal to Sir George Buchanan (Rangoon); a George Stephenson gold medal to Mr. F. W. Carter (Rugby); and Telford premiums to Mr. C. Carkeet James (London), Mr. D. E. Lloyd-Davies (Cape Town), and Mr. W. T. Lucy (Oxford).

We learn with regret that Mr. C. Lees Curties, late partner in the well-known firm of Charles Baker, High Holborn, London, W.C., scientific instrument manufacturer and agent, died on April 24, at fifty-five years of age. We are informed that the business will be carried on as usual, under the same title, by the remaining partners—Mr. T. Hale Curties and Mr. C. Lees Curties, jun.

The President of the Board of Trade has appointed a Committee to control the supply and distribution of petrol, and to consider what measures are necessary in the national interest (1) to ensure that adequate supplies of petrol shall be available for the purposes of the war and for other essential needs; (2) with the above object to regulate the use of petrol for other purposes in the United Kingdom during the period of the war; and, subject to the direction of the Board of Trade, to give executive effect to the measures decided on. The Committee consists of Mr. O. Bury (chairman), Mr. A. E. Bowen, Sir John P. Hewett, and Mr. P. G. L. Webb. Mr. H. W. Cole, of the Board of Trade, will act as secretary to the Committee.

The President of the Board of Trade has appointed two further Committees to consider the position of certain branches of British trade after the war, with special reference to international competition, and to report what steps, if any, are necessary or desirable in order to safeguard that position. These Committees are:—*For the Textile Industries*:—Mr. Henry Birchenough (chairman), Sir F. Forbes Adam, Mr. J. Beattie, Mr. T. Craig Brown, Mr. E. B. Fielder, Mr. J. W. Hill, Mr. A. Illingworth, Mr. J. H. Kaye, Mr. E. H. Langdon, Mr. J. W. McConnel, Mr. H. Norman Rae, Sir Frederick Smith, Bart., Mr. T. C. Taylor, Right Hon. Robert Thompson, Mr. F. Warner. Mr. T. M. Ainscough will act as secretary to the Committee, and all communications relating to it should be addressed to him at 6 Whitehall Gardens, S.W. *For the Electrical Trades*:—Hon. Sir Charles A. Parsons (chairman), Mr. J. Annan Bryce, Mr. T. O. Callender, Mr. J. Devonshire, Mr. B. M. Drake, Sir John Snell. All communications should be addressed to the secretary, Electrical Trades Committee, at 7 Whitehall Gardens, S.W.

The tragic death of Major W. L. Hawksley, R.A.M.C., whilst on active service in France, removes from the service of the Liverpool Corporation a brilliant assistant medical officer. Dr. Hawksley had always been associated with Liverpool, and was a graduate of the University of the city. His first association with the corporation was as a resident medical officer at the Fazakerley Hospital. Afterwards he held the post of assistant school medical officer, and ultimately was appointed an assistant medical officer of health to deal with problems relating to tuberculosis. Following the passing of the National Insurance Act, Dr. Hawksley naturally attained the additional position of acting chief tuberculosis officer, a post for which his previous experience gave him exceptional qualification. The harmonious relationship which now exists between the Insurance Committee and the corporation serves as a lasting monument to his unfailing tact and administrative ability, for upon his shoulders fell much of the original work of organising the Liverpool tuberculosis scheme. Of his services to his country since war was declared little is known to those at home, but, if his military duties were performed with the enthusiasm, tact, and efficiency which characterised his work as a civil servant, the loss to the Army is as deplorable as to the city of Liverpool. His interests were many-sided, for, besides the numerous committees of charitable organisations on which he served, the Atmospheric Pollution Committee has reason to feel the loss of an enthusiastic worker. All who knew Dr. Hawksley will deeply sympathise with his widow and two children in their bereavement.

The *Daily Chronicle* for April 24 gives the substance of an interesting letter sent to Prof. Lorentz, of Haarlem, by Dr. Max Planck, professor of mathematical physics in the University of Berlin, and permanent secretary of the Royal Prussian Academy of Sciences. In this letter Prof. Planck recalls the letter addressed to the civilised world in August, 1914, by ninety-three German scholars and artists, in which they defended the conduct of their own Government, and denounced in extravagant language the action of the Allies. Prof. Planck himself was one of the signatories. He now admits that the form in which this letter was written led to regrettable misunderstandings of the real sentiments of the signatories. In his opinion, and it is an opinion shared, he says, by his colleagues Harnack, Nernst, Waldeyer, and Wilamowitz-Möllendorff, that letter of appeal was written and signed in the patriotic exuberance of the first weeks of the war. It must not be taken for granted, says Prof. Planck, that at the present time anything like a scientific judgment can be formed with regard to the great questions of the historical present. "But what I wish to impress on you," he writes to Dr. Lorentz, "is that notwithstanding the awful events around us I have come to the firm conviction that there are moral and intellectual regions which lie beyond this war of nations, and that honourable cooperation, the cultivation of international values, and personal respect for the citizens of an enemy State are perfectly compatible with glowing love and intense work for one's own country."

According to the *Times* of April 20, the Behar and Orissa Government has issued an account of recent unrest among the Oraons of Chota Nagpur, which is of considerable interest to anthropologists. The unrest would seem to have been brought about by a number of causes, among them a desire to raise the tribe to the higher social level of Hindu and Christian converts, the general unrest caused by the war, and the withdrawal of German missionaries. The chief cause, however, would appear to be an effort made by the Oraons about August, 1915, to expel from their country the evil spirits which they held responsible for the bad crops and the high prices. To effect this object secret meetings were held at night by the younger men, at which powerful *mantras*, or spells, were recited. Into some of these, it is not unimportant to note, the name of the German Emperor was introduced. Acts of violence followed, and extra police were drafted into the district. But, adds the report, the process of pacification is slow, as the expulsion of evil spirits from one village leads to the alleged transfer to another. As might have been expected, the movement was followed by "witch-hunting," in which the general populace took part, as well as the *sokas*, or "witch-hunters." Several murders have taken place. The whole account is an interesting commentary on primitive psychology, with the workings of which readers of Sir James Frazer's discussions of the purification ceremony of "devil-driving," the transference of evils, and the medicine-man will be familiar. It may also serve as a further reminder, should one be needed, of the importance to officials of an understanding of the springs of action in a lower race.

In the recently issued annual report of the Decimal Association for 1915, it is stated that the past year has shown a distinct advance in public opinion in favour of the compulsory introduction of the metric system of weights and measures. It is pointed out that our manufacturers are severely handicapped as regards trade with foreign countries by the retention of our present weights and measures. As the metric system is in use in the majority of foreign markets the British manufacturer who wishes to introduce his goods into those markets is at present obliged to maintain two systems of weights and measures, both in his works and in his office. On the other hand, his competitor on the Continent employs only one system throughout, and that system is understood both by the middleman and the customer. One of the results of the war has been to familiarise the nation with the metric system to a remarkable extent. The presence of our soldiers on the Continent and of Belgian and French refugees in our midst has been an important factor in bringing this about. The nation has already had to experience so many drastic innovations that a reform of our weights and measures would not now meet with that blind opposition from the general trading community which up to the present has been apprehended by the authorities. The inconvenience experienced by the public owing to the exclusion of German and Austrian wares, especially certain classes of goods which have become almost necessaries, must have caused the nation to realise that improvement in our business methods is urgently required. The Association hopes that the Government will take advantage of the favourable opportunity which war conditions have created for introducing legislation to bring our weights and measures into conformity with those which have been proved by our competitors to be the most suitable for stimulating external trade.

The address of Sir Hugh Bell to the members of the Political Economy Club on March 1, published in the *Economic Journal* for April, is a valuable contribution, especially as coming from a great ironmaster in close competition with a great German industry, to the current controversy as to the commercial policy of this country after the war in relation to the Central Powers. Sir Hugh Bell makes it clear that the industrial advance of Germany since 1870 has been the fruit mainly of "the German system of education," which "put into the hands of the German manufacturer the means of conducting his operations in a thoroughly scientific way." "Very carefully trained chemists were turned out of the technical schools by hundreds," and the manufacturers "had the good sense to make use of the materials thus provided." "The field of inquiry was quite new, and offered boundless opportunities of research," and it was vigorously exploited, with the result which the war has made only too plainly evident. Alluding to the manufacture of dyes, regret is expressed that a great new branch of industry has passed from British control, but in this matter blame is laid upon the Government, both central and local, in the enactment of unwise restrictions, the effect of which, as, for example, in the instance of alcohol, has resulted in the serious hampering of industrial development. The great industrial prosperity of the country has also produced an attitude of indifference to scientific discovery in this and other countries, which, in the case of the latter, has silently but none the less surely laid the foundation of great industrial enterprises. "There has never been," says Sir Hugh Bell, "during the last fifty years a time of any duration when it would have been possible to get 10,000 capable workmen to take up new work. There have been plenty of unemployed, but they were persons who, under the conditions existing, were unemployable." There could scarcely be a more eloquent testimony to the need, or a more adequate spur, for a better organised scheme of education by means of which we could create a great reservoir of rightly educated men. We need the vision without which a nation must perish.

The Cuzco valley in southern Peru has become known for its vertebrate remains embedded in comparatively recent gravels (see Nature, vol. lxxxix., p. 584, and vol. xci., p. 615). The Yale expedition was mainly concerned with the antiquity of man, but Mr. H. E. Gregory was enabled to extend his researches to the geology of the valley and its relation to the Andean chain. In the *American Journal of Science*, vol. xli. (1916), p. 19, he presents a new conception of the Andes as an uplifted plateau of continental and marine sediments penetrated by igneous intrusions, the surface of erosion having little regard to geological structure. The deep dissection of this late Mesozoic surface has cut "a number of canyons rivalling the Grand Canyon of the Colorado in depth and ruggedness." The Urubamba has trenched the plateau to a depth of more than 5000 ft. The Cuzco valley is an incident of the plateau, where faulting has helped to produce a depression, in the upper part of which a lake was at one time formed by downwarp.

In the interior of Borneo much exploration remains to be done. Mr. J. C. Moulton, Curator of the Sarawak Museum, has put together an account of the various expeditions to Mount Kinabalu, British North Borneo, from 1851 to his own expedition in 1913 (*Sarawak Museum Journal*, vol. ii., pt. ii., September, 1915). The article is accompanied by a map showing the best routes to the mountain, and contains a good deal of new information, much of it collected from native sources. The same number of the Journal contains a number of valuable articles on the natural history, botany, and zoology of Borneo.

Further evidence that some at least of our British swallows (*Hirundo rustica*) winter normally in the extreme south-east of Africa has come to light by the recovery, near Grahamstown, on February 6, 1916, of a bird which was ringed by Mr. F. W. Sherwood at Lytham, Lancashire, on July 3, 1915. This, remarks Mr. H. F. Witherby, in *British Birds* for April, is the third swallow which has been reported from South Africa similarly marked for identification. The first was ringed as an adult at Rosehill, Cheadle, Staffordshire, on May 6, 1911, and was caught on a farm near Utrecht, Natal, on December 27, 1912. The second was ringed as a nestling at Skelmorlie, Ayrshire, on July 27, 1912, and was caught at Riet Valley, Orange Free State, on March 16, 1913.

Some useful work on Indian Cestoda, by Mr. T. Southwell, appears in the Records of the Indian Museum, vol. vii., part 1, 1916. The author describes a number of species found in Indian fishes, birds, and mammals. He confines his remarks to the anatomical characters of adults. The larval stages, indeed, of many of the species herein surveyed are unknown. More particulars in regard to the hosts of these parasites would be acceptable. Where information on this head is lacking it would be of distinct advantage to say so. The same issue contains a paper by Major R. E. Lloyd and Dr. N. Annandale on the brackish-water hydrozoon, *Campanulina ceylonensis*. The authors have been enabled to work out the complete life-history of this interesting species, and thereby they have discovered that the form described by Browne under the name *Irene palkensis* is really but a senile stage of *ceylonensis*.

Kew Bulletin, No. 1 for 1916, contains a useful paper on the African species of the genus Morinda (Rubiaceæ) by Mr. S. Hutchinson. Four species are now recognised, a new one, *M. confusa*, being described in the paper. Owing to the excellent material sent home by Mr. Lane-Poole, Conservator of Forests, Sierra Leone, the country inhabited by three of the species, it has been possible to draw up careful diagnoses. The fourth species, *M. lucida*, Benth., is not known further north than the Gold Coast. The Sierra Leone species are found in the rain forests of the colony. The species are used medicinally for various purposes, but especially for fever, *M. geminata* having a reputation as being efficacious in cases of yellow fever. The distinctive characters of the four species are well shown in a series of text figures.

An important memoir on the Avezzano earthquake of January 13, 1915, has been communicated by Prof. E. Oddone to the Italian Seismological Society (*Bollettino*, vol. xix., 1915, pp. 71–215). On the small-scale map which illustrates the paper, the isoseismal lines of the epicentral area are shown, the intensity being determined by reference to the Cancani duodecimal scale. In this district there are two chief areas of destruction. The northern area, in which the intensity of the shock reached the degree 12, lies in the basin formerly occupied by the lake of Fucino, and extends from the neighbourhood of Avezzano to that of Lecce. The southern area, in which the intensity was usually 10, but in places 11, lies along the Val Liri. Prof. Oddone attributes the remarkable variations of intensity in the epicentral district mainly to orographic and geological conditions, and not to the existence of separate centres of disturbance. The directions of the movement diverge from an epicentral area a few kilometres in length and elongated from north-west to south-east, the centre of the area being in 41° 58′ N. latitude, 13° 36′ E. longitude, or about 16 km. to the south-east of Avezzano. The ground in this district is broken up by numerous fissures, the most remarkable of which is a perimetral crack, following approximately the course of the isoseismal 12. The crack, which has been traced almost uninterruptedly for 70 km., is usually from 30 to 100 cm. in width, the ground within it (that is, towards the Fucino) being depressed relatively by 30 to 90 cm. The duration of the earthquake, scarcely exceeding five seconds, was one of the shortest of known destructive earthquakes. Prof. Oddone estimates the depth of the focus at approximately 10 km.

The existence of reindeer in Spitsbergen has never been satisfactorily explained, and is a vexed problem in geographical distribution. M. Adolf Hoel has a paper on the subject in *La Geographie* for December, 1915 (vol. xxx., p. 6). His contention that the Spitsbergen reindeer have come from Novaya Zemlya *viâ* Franz Josef Land is supported by a single piece of evidence, but a very strong one. In 1912 an old male reindeer was shot in Spitsbergen that had attached to one of its horns by a piece of cord the foot of an ivory gull. It also had incisions on its ears. There can be no doubt that these markings on the horn and ears were the work of Samoyedes on Novaya Zemlya, who are accustomed to distinguish certain members of their herds in this way. Other reindeer with marked ears are said, but on less secure evidence, to have been shot in Spitsbergen. In any case, this particular deer was not brought from Novaya Zemlya by man. From Novaya Zemlya to Franz Josef Land is about 240 miles, from Franz Josef Land to King Carl Land about 210, and to Edge Island, Spitsbergen, another 55 miles. Winter ice would certainly permit such a journey, but the difficulty is to believe that a reindeer could travel 240 miles without food. However, M. Hoel's explanation seems the only possible one. A passage direct from Lapland to Spitsbergen would be impossible, if only because there is never continuous ice.

Part 2 of vol. xxviii. of the Proceedings of the Physical Society of London contains thirty pages, twenty of which are devoted to the Guthrie Lecture delivered at the end of January by Dr. W. B. Hardy, secretary of the Royal Society. He chose for his subject some of the physical problems raised by the study of living matter. He showed, for example, how the growth of the severed end of a nerve towards its corresponding end is determined by small differences of concentration of some substance diffusing out from the severed ends. The phenomena of growth depend on the presence of minute quantities of substances known as vitamines, often found exclusively in the rinds or skins of grains and fruits, and Dr. Hardy drew a parallel between their action in determining growth and the effect of throwing a few crystals into a supersaturated solution. The remainder of the part is devoted to a short paper by Prof. Lees on a generalised bridge for the comparison of the self and mutual inductances of two coils, and another by Dr. Sand on a cadmium arc lamp similar in principle to the mercury arc lamp.

In 1911 a paper was read before the International Photometric Commission by W. J. A. Butterfield, J. S. Haldane, and A. P. Trotter, describing some careful experiments on the Pentane and Hefner standard lamps. By enclosing these lamps in a special chamber the effect on the light of carbon dioxide, aqueous vapour, and barometric pressure could be conveniently studied; with the great advantage that variations far greater than those met with in practice could be produced, and the resultant changes in candle-power studied on a large scale. In the case of the Pentane lamp the results obtained were in close agreement with those previously reported by C. C. Paterson at the National Physical Laboratory. But the correction for the effect of carbon dioxide and change in barometric pressure on the Hefner lamp were found to be respectively three times and four times that previously assumed by Liebenthal. This question has since been studied by Dr. Ott, of Zurich. With the view of securing exceptional variations in barometric pressure experiments were first made at various stations in high altitudes, but eventually the method of employing a compression chamber was adopted. A change of barometric pressure from 816 to 717 mm., which is the most important range from a practical viewpoint, produced a variation in the candlepower of the Hefner lamp of only 1·1 per cent. This is in close agreement with Liebenthal's formula. But from 717 mm. to 614·5 mm. the variation in candle-power was found to be much greater, and the average effect for the entire range of 816–614·5 mm. approximated very closely to the figure given by Butterfield, Haldane, and Trotter. As regards the effect of carbon dioxide Dr. Ott agrees with these observers in finding the factor given in Liebenthal's formula too small, but this arises from the fact that the presence of much carbon dioxide is in practice usually due to the vitiation of the air of the photometer room. The light is thus affected by deficiency of oxygen as well as the carbon dioxide. Well-ventilated and sufficiently large rooms are therefore essential for standard work.

The accurate measurement of the vapour pressure of ice at low temperatures is a problem of considerable difficulty, not only on account of the smallness of the values involved, but also because of the adsorption on glass surfaces and of the thermal molecular pressure. These difficulties appear to have been overcome in a very satisfactory manner by S. Weber (*Kgl. Danske Videnskabernes Selskabs Forhandlinger*, No. 6, 1915, Copenhagen). The pressure, down to 205° absolute, was measured by means of the loss of heat from a hot Wollaston wire, and below this temperature by Knudsen's absolute manometer. It was also checked more roughly by means of a mercurial manometer with optical contacts, reading to $3\mu$. The residual pressure in the apparatus at 143–163° abs. was 0·053–0·070 dyne per square centimetre for ice from conductivity water, and about half this for ice prepared inside the apparatus from pure hydrogen and oxygen. After correcting for this residuum, which is unaccounted for, an extremely good agreement with Nernst's empirical formula was obtained, down to 175° abs. The same number of the above Journal contains the fifth of a series of papers by C. Christiansen on the frictional electricity generated by drops of a liquid falling on a platinum plate. The effect is much greater for solutions of non-electrolytes (mercuric cyanide, triamminocobaltinitrite) than for those of electrolytes (mercuric chloride, hexamminocobaltichloride).

In a paper entitled "Theory and Practice in the Filtration of Water," read to the Institution of Mechanical Engineers on April 14, Mr. W. Clemence attempts to prove that the multiple filtration process invented by MM. Puech and Chabal is economically and hygienically the most efficient process of water purification. The process consists of passing the water through a series of filters filled with material ranging from coarse gravel in the first to fine sand in the last, the greater part of the suspended matter in the water being retained by the earlier elements, so that no film forms on the surface of the final sand filter, the work of purification being effected by nitrifying organisms in the body of the sand, thus differing from other processes, which depend largely on the straining effect of a surface film formed by natural or artificial means. While making the best case he can for the multiple process—and on the whole a good case—the author scarcely does justice either to mechanical or ordinary slow sand filtration. Most water experts now agree that these latter processes cannot be taken as the "only line of defence" against water-borne disease, but with an initially "safe" water the improvement in appearance and the removal of oxidisable matter effected particularly by mechanical filters are often most marked. On the other hand, it is claimed that the multiple process is capable of rendering safe an unsafe water, although no conclusive evidence in the way of figures is brought forward to prove it. Indeed, throughout the paper, which gives in considerable detail the results of tests made on multiple filtration plants in different parts of the world, there is no mention of any tests being made for *B. coli.*

THE Health of Munition Workers' Committee has issued a memorandum on special industrial diseases in which it is stated that the work of certain industrial processes entails risk of serious, and possibly fatal, illness from exposure to lead, ethane tetrachloride, nitrous fumes, and certain explosives, whilst contact with trinitrotoluol, tetryl, mercury fulminate, and certain lubricating and cooling liquids used in metal turning may produce dermatitis. The provision of facilities for the prompt treatment of all cases of sickness and injury is recommended. Operatives engaged in manufacturing or handling trinitrotoluol have been found affected with unusual drowsiness, frontal headache, eczema, and loss of appetite. The symptoms are generally slight at first, and disappear when exposure ceases, but in exceptional cases sudden collapse may occur after a few hours' work on a hot day. The symptoms are intensified by continued exposure, and in a few cases profound jaundice and even death have resulted. T.N.T. may be absorbed by the lungs, skin, or digestive tract, in the form of vapour or dust, and certain preventive measures are specified.

BULLETIN No. 266 of the Scientific Papers of the Bureau of Standards, by Messrs. Cain, Schramm, and Cleaves, deals with the preparation of pure iron and iron-carbon alloys. The authors have worked out methods of producing laboratory samples of iron-carbon alloys of a very high degree of purity; sources of contamination of melts and means of eliminating them are described; a method of preparing magnesia of a satisfactory degree of purity for making crucibles to be used in work of this kind has been developed; and a procedure for making small ingots, which are sound and free from blowholes, without the use of deoxidisers, has been worked out. A series of iron-carbon alloys containing 99·96 per cent. of the two elements has been prepared to serve as a basis for the redetermination of the iron-carbon equilibrium diagram.

IN Bulletin No. 60 of the Technological Papers of the U.S. Bureau of Standards, H. S. Rawdon describes the microstructural changes accompanying the annealing of cast bronze (Cu88, Sn10, Zn2). The alloy is first brought into physico-chemical equilibrium. The dendritic structure persists until heated for approximately two hours at 800° C. The absorption of the eutectoid depends much on how the sample cooled on freezing. No evidence was found suggesting a change of crystal size of cast samples which had not been distorted in any way. Recrystallisation, including twinning, was found only to follow distortion or its equivalent. Metal cooled suddenly from the molten state behaves similarly because of the high internal stresses resulting.

MESSRS. CASSELL AND CO., LTD., have ready for publication "Alfred Russel Wallace: Letters and Reminiscences," by J. Marchant. The volume will contain a number of hitherto unpublished letters, reminiscences from various friends, and a sketch (from his son and daughter) of Dr. Wallace's home life. The evolution of the idea of natural selection is traced up to the time when the papers on the subject by Darwin and Wallace were communicated to the Linnean Society, and Dr. Wallace's other scientific work is dealt with in the volume.

## OUR ASTRONOMICAL COLUMN.

THE PLANET MERCURY.—This planet will be at greatest E. elongation on May 12, 21° 36′ E. from the sun. It will continue above the horizon about two hours after sunset. Maximum conspicuousness occurs several days *before* the elongation.

COMET 1916*a* (NEUJMIN).—Observations, including an arc of thirty-seven days (February 27–April 4), have been employed by M. J. Braae in calculating a new orbit for this comet. The second and third places are based on observations made at Bamberg (March 23) and Neu Babelsberg. The modifications of the earlier orbit are all in the direction of the Berkeley orbit noted last week, consequently the differences between the respective ephemerides have been considerably reduced. According to Copenhagen Postcard No. 17 the new orbit is:—

$T = 1916$ March 11·2350 G.M.T. $P = 2008{\cdot}8$ days (5·50 y.
$\mu = 645{\cdot}163''$

Epoch 1916 Jan. 0·5 G.M.T.
$M_0 = 347^\circ\ 19'\ 24{\cdot}5''$
$\phi = 34^\circ\ 43'\ 4{\cdot}7''$
$\text{Log}\ a = 0{\cdot}493559$

Equinox 1916·0
$\omega = 193^\circ\ 43'\ 17{\cdot}7''$
$\Omega = 327^\circ\ 30'\ 59{\cdot}6''$
$i = 10^\circ\ 39'\ 53{\cdot}0''$

Ephemeris (Messrs. J. Braae and J. Fischer-Petersen), Greenwich midnight:—

| | h. | m. | s. | ° | ′ |
|---|---|---|---|---|---|
| April 28 | 10 | 20 | 36 | − 9 | 41·9 |
| 30 | | 24 | 59 | 10 | 10·7 |
| May 2 | | 29 | 24 | 10 | 38·7 |
| 4 | | 33 | 51 | 11 | 5·9 |
| 6 | | 38 | 21 | 11 | 32·3 |

Log Δ April 26, 9·7979, May 4, 9·8386

Observations made at the Hill Observatory, Sidmouth, on April 20 and 22, were represented by this ephemeris within the limits of accuracy attainable in the measures. On April 22, the sky being especially clear, the comet still showed a considerable diffused coma and a feeble condensation was glimpsed.

THE IRREGULAR VARIABLE STAR, T TAURI.—The annual report of the director of the Mount Wilson Solar Observatory for 1915 bears more resemblance to a review of the world's work in astronomical physics than the report of a single institution. The summary contains seventy-eight important items. No. 61 states that the irregular variable star, T. Tauri, is surrounded by an extensive atmosphere 4″ in diameter, which shows the bright lines characteristic of Wolf-Rayet stars. The spectrum of the star proper is about F5. The magnitude of this remarkable object ranges between 10·3 and 13·2. Notwithstanding the impressive output of work it appears there is room for regret—the 60-in. reflector remains the only instrument for work on stars and nebulæ, but it is offset by a crescendo of hope—the 10-in. portrait lens telescope is nearly ready, and the 100-in. reflector is expected to be in working order by the end of 1916.

A NEW VARIABLE STAR HAVING NEBULOUS ENVELOPE.—An addition to this at present very limited group of extremely interesting objects is announced by Mr. R. T. A. Innes in Circular No. 33 of the Union Observatory. The star is −37° 8450 in the Southern Crown, and normally its magnitude is 8·7, but on two occasions last year, October 29 and November 24, it was considerably fainter (12·4 and 11·5 respectively). The nebulous envelope was also found to vary. The 6·88 magnitude star, −37° 8449, possesses a similar appendage, and is so near to the above as to touch, thus affording an excellent basis for comparison. It is tantalising to think that these stars actually come above our horizon.